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BIODIVERSITY OFFSETS: OPPORTUNITIES AND CHALLENGES FOR MANAGING CUMULATIVE IMPACTS OF LARGE-SCALE LAND-BASED INVESTMENTS ON AFRICA'S FOREST LANDSCAPES AND THEIR BIODIVERSITY

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Abstract

In the Western Congo Basin, the Tri-National Dja Odzala Minkebe (TRIDOM) Landscape covers 178000 km² in south-east Cameroon, north-east Gabon, and north-west Republic of Congo. Almost 97% is covered by tropical rainforest and is globally important for the conservation of large mammals (elephants, gorillas, chimpanzees). TRIDOM is also an emerging iron ore province with 9 iron ore deposits currently being explored. Mining and associated infrastructure will, under a business as usual scenario, lead to the widespread fragmentation of this forest landscape. Developing these projects with no-net loss or net gain biodiversity objectives as a condition for access to finance offers opportunities but a landscape-level approach is needed to take into account, and mitigate, indirect and cumulative impacts. There are numerous technical challenges and policy implications to this as the development and implementation of a landscape-scale vision for conservation and development in the TRIDOM requires coordinated efforts by various sectors of government and mining companies, and legal and financial tools to secure long-term land-use rights across the various interacting sectors. In this context, there are lessons to be learned from the TRIDOM for other biodiversity-rich landscapes faced with large-scale land-based investments in mining, oil & gas or agro-industrial sectors.

Key Words:

Mitigation hierarchy, performance standards, illegal wildlife trade, protected areas, public private partnerships

Introduction

Countries aspiring to become emerging economies are generally proactive in organizing the exploitation of their natural resources so as to achieve their broader economic and social development goals (Laurance et al. 2014a, Edwards et al. 2014, Meyfroidt et al. 2014). As a result, they often welcome large land-based investments in natural resources, including agriculture, forestry, minerals and oil and gas projects, among others. The expansion of soja in South America (Grau & Aide 2008) or oil palm in SE Asia, and now central Africa (Feintrenie 2014), highlight the intensity and speed of this land-use change dynamic. As a result, large areas of natural habitats are being converted, frequently with severe environmental, socio-economic and health impacts as humans move into previously sparsely populated lands (Edwards et al. 2014, Laurance et al. 2014b, Caro et al. 2014). In central Africa, pervasive poverty, competition for commercial land contracts, and road-building are threatening the last extensive forest areas and their biodiversity (Wilkie et al. 2000, Megevand 2013).

Protected areas play a key role in reducing these impact, as they are one of the few land use management options that have shown can halt and even reverse the loss of wildlife and biodiversity, even if many parks are still paper parks, and protected areas are also subject to downgrading, downsizing, and degazettement mostly for access to land and the use of natural resources (Mascia & Pailler, 2011). Protected Areas alone will thus not halt biodiversity loss at the global scale (Hanski 2011,, Lindenmayer & Franklin 2002, Lindenmayer et al. 2006). The importance of the wider landscape in conservation is acknowledged by academics, practitioners and at international policy levels (Sayer et al. 2013). The Convention on Biological Diversity's Aïchi Target 11 thus states that protected areas networks need to be "(…) integrated into the wider landscapes and seascapes". The conservation of biodiversity must be integrated into land-use decisions well beyond the limits of designated protected areas.

Outside protected areas, encouraging inward investment while striking a sound balance between different interests, respecting the legal and customary rights of local populations and conserving biodiversity represents a major challenge (Garcia et al. 2010). A key obstacle is the absence of effective land use planning at the national or regional level and poor coordination between sectors, with the forestry, agricultural, infrastructure, urban development, and extractive sectors largely operating independently of each other. The challenge lies in identifying policy instruments that are able to govern land use changes resulting from economic development in a manner that results in no net loss of biodiversity while engaging land-users in conservation (Opdam et al. 2013). Biodiversity offset mechanisms are one candidate for such an instrument.

Investments and development activities will have negative impacts on biodiversity, even when all measures are taken to prevent, reduce and restore environmental damage. Biodiversity offset are a mechanism whereby developers operating in an area undertake or fund measurable conservation operations whose outcomes fully compensate for these residual (adverse) impacts. Current policies usually permit the uncompensated or poorly-compensated loss of natural habitat (Brownlie et al. 2013). Poor implementation and weak governance further worsen this trend. Policies (i) that require rigorous application of prior impact mitigation steps for proposed development projects in addition to clear, quantified offsets or compensation for residual losses of biodiversity, and (ii) underpinned by limits to what can be offset (as recommended by the BBOP Standard of 2012) are an improvement over policies that do not consider these steps adequately. Policies also need to set measurable biodiversity goals to the development of appropriate mitigation measures before permitting development projects, and these goals need enforcement.

The loss of rainforest is an emerging issue in the Congo Basin (Scholes & Biggs 2010). These forests are some of Earth's wildest areas (Sanderson et al. 2002). They are globally outstanding for their biodiversity and the level of threat was comparatively low compared to other eco-regions in Africa. They have been relatively well preserved up to now due to low demographic pressure, limited accessibility, poor infrastructure, low impact logging and rural exodus (Burgess et al. 2006, Megevand 2013). But, deforestation in the Central African region has increased in recent years, with a deforestation rate moving from 0.13% between 1990 and 2000 to 0.26% between 2000 and 2005 (Ernst et al. 2013). Even though climate change will have an increasing impact, land use change, in particular forest conversion, will remain the major driver of environmental change in the region (Dawson et al. 2011). The 21st century will thus mark a transition for the forests of the Congo Basin, as they enter the anthropocene. And the role of large-scale investments from agro-business, mining and infrastructure suggests biodiversity offsets can play a critical role in shaping the futures of these forests.

In this paper, we explore how large land-based investments could affect Central Africa's forest landscapes, and discuss offsets as a possible solution to manage those impacts. Finally, we draw lessons which could be applied to other biodiversity-rich landscapes faced with large-scale land-based investments.

The challenge of no net loss

No net loss goals are increasingly being set by governments (ten Kate & Crowe 2014) as well as companies (Rainey et al. 2014). Financial institutions are becoming increasingly aware of biodiversity

issues when investing in projects, both as a contribution to the CBD objectives under the "global compact" and as risk management strategies. They realize negative environmental and biodiversity impacts pose operational and legal risks but also tarnishes their image and have ethical implications. Biodiversity offsets are one mechanism used to reduce these risks, and to ensure and be able to convincingly demonstrate that no net loss of biodiversity results from the activities they finance (Doswald et al. 2012). The World Bank itself is in the process of updating its environmental safeguards.

Among financial institutions, the International Finance Corporation (IFC) has the most widely used set of standards to address biodiversity risks. Its Performance Standard 6 (PS6) has been taken up by private banks gathered under the Equator Principles. Together, they cover over 70% of private debts in emerging economies (Rainey et al. 2014). Among its objectives, PS6 aims to ensure that projects do not cause a net loss of biodiversity values in natural habitats, and generate a net gain in "critical habitats" that harbor particularly threatened biodiversity. This can then be counted as a contribution to the broader objective of restoring threatened biodiversity (Brownlie & Botha 2009). Abundant guidance is provided on how no net loss and net gain can be achieved, with the mitigation hierarchy as a central concept. Under this hierarchy, impacts on biodiversity must be avoided and reduced; temporary impacts require restoration; and any residual impacts must be offset to achieve no net loss (NNL) or a net gain (NG) of the affected biodiversity values.

Conformity with PS6 requires project proponents to prepare a Biodiversity Action Plan and/or Management Plan describing how these various steps will be implemented, the expected outcomes, and the associated monitoring and reporting. Developers seeking to comply with PS6 requirements are therefore looking for operational solutions to achieve NNL/NG goals, and particularly on the tricky issue of offsetting residual impacts. A community of practice has developed around the issue, in which the Business and Biodiversity Offsets Program (BBOP) has played a key role since it was established in 2004 (Benabou 2014). BBOP currently has a membership of over 75 organizations that include financial institutions, conservation organizations, companies from the extractives, civil engineering and agricultural sectors, as well as specialist service-providers who are competent in the design, execution and/or auditing of biodiversity offsets and action/management plans.

In 2012, BBOP published a standard on biodiversity offsets which offers the following definition of offsets as "measurable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development after appropriate prevention and mitigation measures have been taken". Furthermore, "the goal of biodiversity offsets is to

achieve no net loss and preferably a net gain of biodiversity on the ground with respect to species composition, habitat structure, ecosystem function and people's use and cultural values associated with biodiversity". While biodiversity offsets are defined here in terms of specific development projects (such as a road or a mine), they could also be used to compensate for the broader effects of programs and plans (BBOP 2012).

In this paper, we use the BBOP standard to guide our analysis of the options available to balance large land-based development in the forest landscapes of central Africa with the conservation of its unique biodiversity values. We use the forest landscape of the TRIDOM to illustrate this.

The forest landscape of the TRIDOM

In north-east Gabon, north-west Congo, and south-east Cameroon, the 178,000 km² Dja – Minkebe - Odzala forest landscape, or TRIDOM, is among the most intact and wildlife rich forests left in the Congo Basin (De Wachter et al. 2009). Vast areas are uninhabited, while Bantu and Ba'ka (pygmy) people live in scattered villages along the few roads. Overall population density is around 1 inhabitant/km² and rural livelihoods are based on subsistence agriculture, fishing and hunting, artisanal gold mining and cocoa farming. Almost 97% of TRIDOM is lowland tropical rainforest; 24% is gazetted as a protected area and around 60 % is attributed to logging concessions.

The TRIDOM is also an emerging iron ore province and at least 8 companies are currently involved in preparing mining projects. The Mbalam-Nabeba project (Sundance Resources) is ready for development, pending the necessary $4.5 billion needed to fund initial investments. Most of these projects are situated in the thinly populated "interzone" between protected areas. It is feared that the needed infrastructure (railroads, roads, transmission lines) and the associated indirect and cumulative impacts (especially from the influx of population) will lead to the demise of TRIDOM as a continuous forest landscape, and reduce it progressively to a set of vulnerable and isolated protected areas, unable to conserve their key features which are dependent on large scale ecosystem processes.

Two of the mining companies, Sundance Resources and IMIC (Nkout iron ore deposit in Cameroon) have already indicated that they will apply the performance standards of the International Finance Corporation, and in particular PS6 on biodiversity and natural resources. One driver of this commitment is possible funding by Equator Principles Banks (e.g. Standard Bank of South Africa which has been appointed as non-exclusive lead debt arranger for Sundance's project). The TRIDOM interzone is most likely a "critical habitat" under the IFC performance standard, not least because it contains critically endangered species (western lowland gorilla), endangered species (chimpanzee) and regionally endangered species

(forest elephants). In addition TRIDOM, as one of the least populated extensive forest landscapes in the Congo Basin, is a unique ecosystem that also exhibits key evolutionary processes. Access to Equator Principles Banks' finance for projects in this area will require the proponents to demonstrate a net gain for a number of biodiversity values. How this might actually be achieved is a real challenge. Most likely, projects will need to design and undertake biodiversity offsets that provide positive conservation outcomes over and beyond the residual impacts that can be attributed to the projects.

Applying the mitigation hierarchy in the TRIDOM

At the scale of the TRIDOM, the planned mines have limited footprints. For example, Sundance Resources estimates 20 km² of direct deforestation for the needs of Nabeba's mine and railroad (in Congo). As is often the case, the lurking dangers are the indirect and cumulative impacts of mining and infrastructure development in TRIDOM. In fact, the "resource corridor" approach that has been heralded by development banks like the World Bank and the African Development Bank as a catalyst model to boost economic growth in Africa could pose serious problem with regard to managing cumulative impact on biodiversity and the maintenance of ecosystem services.

A key measure for the application of PS6 is therefore to avoid the creation of new permanent settlement in previously uninhabited or little inhabited areas. Avoiding the hassle and costs of having to deal with pioneer settlements in the vicinity of their projects is an advantage for mining companies, and allows them to direct development initiatives to the existing towns and villages, thus benefiting local communities rather than pioneer settlements. This means that mining base camps, for example, should operate according to an offshore model, with workers' families residing in existing towns. Access roads should also be considered as private roads and closed to settlement or private traffic. As an example, the 65 km road build in Congo by Core Mining to access their Avima deposit has already led to immigration of artisanal gold miners and associated traders (1900 people of which only 10% are Congolese). Some of them are engaged in illegal activities involving bush-meat hunting and elephant poaching for ivory. This could have been avoided by strictly controlling access along the Avima road, and is a situation that has been complicated by unclear government policies on the use of such new roads. Given the scale of infrastructure development plans in the TRIDOM, this issue has to be clarified while it is still manageable.

Offset opportunities

In spite of these efforts, and if projects do go ahead, there will most likely be residual impacts to be offset. Large pristine ecosystems such as the TRIDOM landscape are an extreme context in which to consider

the applicability of biodiversity offsets, and the achievability of NNL and NG objectives (Pilgrim et al. 2013).

Assessing the feasibility of achieving no net loss goals and the limits to the impacts that can be offset is a key principle in the BBOP standard. Time-lags, uncertainties and risks relating to restoration success could lead to a net loss of biodiversity (Maron et al., 2013) and this is a major risk to the use of offsets to achieve NNL/NG goals in the TRIDOM. For example, Curran et al. (2014) argue that because old growth habitats cannot be restored within reasonable time frames, offsets will lead to a net loss of biodiversity no matter how. However, mining projects have a limited footprint which may mean that only a limited area of high value old growth forest will be impacted. Logging and agro-industrial plantations (especially rubber, in Cameroon) are much bigger threats to protection of old growth forests, and offsets offer the opportunity to ensure protection of 'threatened habitats, and thus produce a net gain in the total acreage of protected old growth.

Through conservation set-asides, the mining projects could contribute to the expansion of protected areas in the TRIDOM, thus increasing the area of forest under effective protection. Sundance Resources' Mbalam project in Cameroon has already established a 1640 km² "conservation concession" and Sundance indicates willingness for a 2000 km² set aside for its Congolese Nabeba project. To be considered as offsets, such set-asides raise complex technical issues around their additionnality, especially given low background rates of deforestation under current land-uses in the TRIDOM (Mosnier et al. 2014). Future scenarios, however, clearly point towards their dramatic increase, providing a clear rationale for investing in conserving existing and interconnected old growth forests blocs. Therefore, at the project-level a no net loss outcome can be achieved through "averted loss offsets". The key requirement is that losses from the project are independent of the background rate of biodiversity loss. To put it simply, in landscapes where all development projects and other activities with impacts on biodiversity are required to achieve no net loss, there is no – or most likely a low - background rate of loss, and averted loss offsets are generally not appropriate (Quétier et al. 2015). In addition to contributing to an increase in the area of forest under protection or sustainable resource use, averted-loss offsets must also be chosen so as to contribute to ecological connectivity, thereby ensuring the robustness of large-scale ecological processes which are one of the key ecological features of the TRIDOM landscape in its current form.

An alternative to averted-loss offsets would be for mining companies to fund ecological restoration of degraded forests, outside their direct footprints. The TRIDOM interzone suffers from intense elephant

poaching (Maisels et al. 2013), driven by high prices for ivory (Wittemyer et al. 2014). The mining projects could fund anti-poaching capacity, thus stopping and eventually reversing elephant population decline, and provide economic incentives linked to conservation or sustainable use to the communities close to key wildlife habitat and the mining areas. This could benefit not only many species such as great apes, African soft-shell turtles, mandrills, pangolins, leopards, and the last hippos remaining in the Ivindo river Basin, but also highly significant forest regeneration processes as the elephant is a keystone species, having a critical role in the dispersal of forest seeds (Beaune et al. 2003). There are other avenues for enhancing the biodiversity value of degraded forests, by targeting on-going sources of degradation, habitat characteristics, or species of concern (e.g. through reintroductions as discussed by King et al. 2014). In essence, degraded forests, especially those emptied of their large fauna, can be restored and provide positive conservation outcomes that can offset some of the losses associated with large-scale land-based investments.

A dual strategy of achieving gains via averted loss and restoration actions could be appropriate in the TRIDOM as the forests of the TRIDOM still offer tremendous scope for protecting large areas of largely natural habitat and this opportunity should not be missed. However protection and restoration are combined, appropriate metrics and exchange rules will have to be developed in order to demonstrate that no net loss or net gain objectives are achievable, and achieved (Quétier & Lavorel 2011). These would probably include some form of biodiversity or conservation credits, as is being discussed in Gabon under the country's 2014 Sustainable Development law. In addition, for averted-loss offsets, agreements on the baselines of biodiversity against which gains and losses are to be assessed will need to be reached (Bull et al. 2014, Gordon et al. 2015). Similar difficulties have been raised by the REDD process which assimilates avoided deforestation and forest degradation to green-house gas sequestration (see Karsenty & Ongolo 2012 for a discussion in the context of Cameroon).

The institutional challenge of ensuring long-lasting success

Successful implementation of offsets requires innovation in solving serious institutional, legal and financial challenges (IUCN 2014). As well as their ecological and economic dimensions, processes must be in place for validating offset designs and implementation, and transferring offset liabilities tied to particular projects (e.g. in case projects are bought or sold). A key requirement for offset implementation is the design of legally binding obligations around ecological outcomes. This can be achieved through licenses or contracts such as performance management contracts where payments are conditioned on achieving ecological performance targets within an agreed time frame (with appropriate, independent, oversight).

On the ground, long term protection of offset gains can be provided through leases and contractual provisions (as in so-called "conservation concessions" – Sandker et al. 2011). Moreover, land can be committed to conservation purposes, through covenants, servitudes or easements if such legal tools exist, or through designation in binding planning documents, such as gazetting as protected areas. Long term financial capacity can be guaranteed through insurance, performance bonds and trust funds. Such instruments are used in many countries with established "conservation banking" mechanisms, and mining companies are familiar with such requirements concerning rehabilitation and decommissioning. Trust Funds can be used to aggregate funding from developers and facilitate its delivery to restoration in countries with low institutional capacity for establishing offset mechanisms (Spergel & Taïeb 2008). In the region, the Tri-Sangha foundation (*Fondation Tri-Nationale de la Sangha*) offers a good model for the establishment of such as fund. In any case, support from local communities is crucial. As with all conservation programs, careful attention needs to be paid to the human dimensions of biodiversity when designing and implementing biodiversity offsets. This is a key principle of the BBOP standard.

Conclusions

Going beyond project-by-project approaches to mitigating environmental impacts is getting increased attention worldwide, in particular as companies and governments devise ways to apply biodiversity-related performance standards in ways that are cost-effective and ensure that the resources allocated to biodiversity through the mitigation hierarchy actually contribute to long-term conservation goals.

In the TRIDOM, if all mining projects were to contribute to significant conservation set asides, wildlife conservation activities and forest restoration programs, this could be a game changer for biodiversity's short- and long-term prospects in the area. As in many other instances, a landscape-level approach is needed to take into account, and mitigate, indirect and cumulative impacts from large land-based investments and development opportunities. The development and implementation of a landscape-scale vision for conservation and development in the TRIDOM requires coordinated efforts by various sectors of government and mining companies, e.g. through land-use planning and strategic environmental assessments, as well as the development of legal and financial tools to secure land-use rights across the various interacting sectors (mining, oil & gas, forests, agriculture, conservation, etc.).

Governments will need to contribute actively to such a process, especially since land-use rights are typically granted through sector-specific concessions that have varying requirements in terms of biodiversity and rural livelihoods. It remains unknown whether such willingness will emerge in the region (Ongolo 2015), but the prospect of ensuring adequate solutions are available for large-scale land-based

investments to conform to lender requirements – including offset opportunities - can provide strong incentives to governments to develop national offset policies (Kormos et al. 2014). Long-term success will, however, require enduring political will, backed up by public concern.

As with any policy, the right institutional arrangements and oversight mechanisms must be put in place to ensure effective implementation, and in this case for offsets to be conducive to no net loss (McKenney & Kiesecker 2010; Van Teeffelen et al. 2014). Arranging long-term protection and financing arrangements for offsets will require close collaboration between financial institutions, mining companies and various sectors of government. Such collaboration could lead to aggregated offsets whereby several developers pool resources to set-up larger offset actions that are more effective, easier to monitor and enforce, and therefore longer lasting. The World Bank is exploring aggregated offsets in countries such as Mozambique and Liberia. Conservation Trust Funds are another well-tested solution to the challenge of effectively offsetting residual impacts.

In the context of Africa's forest landscapes, biodiversity offsets offer an opportunity for the private sector to contribute to the conservation of large extents of threatened old growth forests by strengthening protected area networks that are desperately underfunded (Pilgrim & Bennun 2014), and by contributing to conservation actions in the broader landscape that is urgently needed to avoid a widespread empty forest syndrome (Wilkie et al. 2011). In this context, there are lessons to be learned for other biodiversity-rich landscapes faced with large-scale land-based investments in mining, oil & gas or agro-industrial sectors.

Given the current status quo of biodiversity loss which is rarely or not adequately mitigated and compensated, biodiversity offsets, undertaken within a rigorous application of the mitigation hierarchy, provide a useful framework to envisage balancing development and conservation goals. While no net loss will be very challenging to achieve in most cases (Gardner et al. 2013), and particularly in Africa's forest landscapes, it provides a framework to drive better mitigation – including avoidance, minimization and offsets. Effective application of the mitigation hierarchy aiming for net gain could have huge impact, including by the protection of threatened old growth forest. Time is running out however, as there is much pressure to log the last unprotected old growth forest that remain or convert them to other uses.

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